be secured in future investigations of the same kind; nevertheless, it is certain that Lord Lindsay and Mr. Gill have been amply justified by the result in the confidence they placed upon the proposed methods of observation, and have proved that one means of determining the solar parallax, admitting comparatively of very frequent repetition, is comparable in point of accuracy with methods involving far greater difficulty and expense and chance of failure. In the correction of the equations of condition for errors in the tabular places of Juno, derived from observations at Greenwich, Washington, and Cambridge, U.S., it was found desirable to work upon two systems, the probabilities being rather in favour of the second. The definitive result for the mean solar parallax is 8″·77, according to the first system, and 8″·76 according to the second. To these values and their probable errors (± 0″·04) the authors do not attach high importance, indeed, a discordant value from observations on November 15 being included, they say, "if we were asked what we believe to be the most probable value resulting from the determination, we should reject this result; the values then become 8″·82 — first system; and 8″·81 — second system. At the same time we are aware that the rejection of any observation is quite unsound." In a longer series, however, it is probable, as they observe, that the single discordant value would have been counterbalanced by another.

So far as we know, this is the first application of the heliometer to observation in the southern hemisphere. We think it must be generally conceded by astronomers that Lord Lindsay and Mr. Gill have rendered an important scientific service in this introduction of the most accurate of measuring instruments in the investigation of the sun's distance, by a method admitting of such repeated confirmation. Three of the minor planets approach the earth in the present year within the distance at which Juno was observed at the Mauritius in 1874.

THE SATELLITES OF MARS.—Prof. Asaph Hall, to whom, as the discoverer of these bodies, the right of selection of names appertains has definitively decided for *Deimus* for the outer moon and *Phobus* for the inner one, agreeably as he mentions to the suggestion of Mr. Madan in these columns, founded on the lines in the "Iliad," which Pope thus renders :—

> "With that he gives command to *Fear* and *Flight*,
> To join his rapid coursers for the fight;
> Then grim in arms, with hasty vengeance flies,
> Arms that reflect a radiance through the skies."

THE DATE OF EASTER.—Easter Sunday falling on April 21, is considered late this year, and it is thirteen days after the mean date, but it is to be remarked that in no year since the introduction of the Gregorian calendar into England has the festival occurred on the latest possible date, April 25, though in two years, 1761 and 1818, it fell on March 22, which is the other limit. In 1886, Easter Sunday will fall on April 25, in the new or Gregorian style, for the first time since the year 1734, or eighteen years before this style was accepted in England. The only other occasion since the reformation of the Calendar by Pope Gregory XIII., upon which Easter has fallen on the latest possible date was in 1666, and after 1886 this will not again occur till 1943.

BIOLOGICAL NOTES

THE AGRICULTURAL ANTS OF TEXAS.—Mr. H. C. McCook has presented to the Academy of Natural Sciences of Philadelphia a memoir on the habits of these most curious and interesting ants (*Myrmica molefaciens*, Buckley = *M. barbata*, Smith). An abstract of the memoir will be found in Sheet 20 of the *Proceedings* of the above Academy (p. 299). The author encamped in the midst of a large number of the ant hills during the summer of 1877, and carefully studied the habits of the inmates; the spot selected was in the neighbourhood of Austin, Texas, upon the tableland to the south-west of the Colorado River and its affluent, Barton Creek. The limestone rock here and there cropped up, the soil was black and tenacious, varying in depth from a few inches to three feet. The formicaries were very numerous, and were to be found along roads, in open fields, and in the very streets, paths, gardens, and yards of Austin; indeed, one was even seen in the stone-paved courtyard of an hotel. They are commonly flat circular clearings, hard and smooth; a few have low mounds in the centre, composed of bits of gravel of one or two grains' weight; the clearings vary in width from twelve to two or three feet. From each, roads three to seven in number, diverge into the surrounding herbage. These are often of great length, and during the working hours are thronged by the ants going and returning. The ants take their siesta during the meridian heat of the sun, generally stopping work about twelve, and not returning to it until two or three o'clock. The seeds collected were always taken from off the ground, they were chiefly seeds of small Euphorbiaceous and Rubiaceous plants, and of grasses. The ants proved to be true harvesters. The seeds were carried into the granaries through the central gates. They were shelled, and the hulls were carried out and deposited in refuse heaps, which, when carefully searched, yielded no perfect fruits. They seemed to be most fond of the grass called *Aristida stricta*, and it even seems possible that they sow this for themselves, though the author does not commit himself to this as a fact. The interior economy of the ant-hill is fully described. Here it may be noted that the ants are clever in attack, that their "sting" is as bad as a wasp's, and that they are so well versed in the science of war, that they would have been more than a match for Mr. McCook, had he not himself employed a small army (of two men) to fight with those ants that would fight with him while he was pulling their granaries, their nurseries, and their queen's palace to pieces, in order to let us know all about them. Prof. Leidy made some remarks on this paper, adding that he had studied the habits of an allied species (*M. occidentalis*) which he had met with during a summer in the Rocky Mountains. The habits of this species were very like those of the species described by Mr. McCook, but in addition Prof. Leidy mentioned that his species fostered a fine large Coccus for its saccharine production.

THE FIRST STAGES OF DEVELOPMENT IN PLANTS.—Great interest attaches to the earliest changes occurring after the fertilisation of the germinal cell or oösphere in plants; and the difficulty of the subject has taxed the ability of the best histological botanists. To satisfy the doctrine of evolution many students think it necessary to be able to trace homologies in the development of all stem-bearing plants. The latest investigation, which appears to carry the comparison further than has yet been attempted, is that of Mr. S. H. Vines, of Cambridge, who has diligently sought out and compared all the embryological evidence, derived from the writings of Hofmeister, Hanstein, Fleischer, Mettenius, Pringsheim, and many others. He shows that in all stem-bearing plants the germinal cell (that which is fertilised) divides into two portions, one of which gives rise to an embryonic tissue called suspensor, in higher forms, while the remainder alone produces the true embryo. This comparison is of especial interest in relation to mosses. In these plants it is the spore-capsule which is the product of the fertilisation of the germ-cell, and it is this capsule which corresponds to the whole leafy plant of a fern. Following out the analogy, the seta or stalk of the capsule in a moss corresponds with the part called "foot" in an embryo fern, and with the suspensor in flowering plants. Mr. Vines's paper is contained in the

January number of the *Quarterly Journal of Microscopical Science*.

RHIZOPODS IN AN APPLE TREE.—Freshwater rhizopods are beginning to be well known, but Prof. Leidy has lately discovered a number in an apple-tree. While waiting for a railway train, last December, his attention was attracted to a large-apple tree which had then quite recently been thrown down by a storm, and from the fork of its trunk he collected a small bunch of moss, which, on examining it carefully, he found to contain a number of rhizopods. Of these one was *Difflugia cassis*; it was abundant. Another, which occurred in smaller number, was *D. globularis*, and in addition, some specimens of *Trinema acinus*, *Euglypha alveolata*, and *E. brunnea*, were met with. The moss from which they were washed with filtered water was found at a distance of about eight feet from the ground (*Proceedings*, Acad. Nat. Scien. Philadelphia, 1877, p. 321). We hope this hint will not be lost by the investigators of our British or Irish rhizopods.

THE AERONAUTIC FLIGHT OF SPIDERS.—Many observations have been made on this singular phenomenon, but the Rev. H. C. McCook is pursuing his inquiries with a perseverance that succeeds in detecting many new details in the performance. Recently (October, 1877) he paid attention to groups of young wolf-spiders (Lycosidæ), which crowded the tops of railings in a meadow. Their faces were turned in the direction from which the wind was blowing; the abdomen in each was elevated at an angle of 45°, the claws brought in, and the legs stiffened, thus raising the body. From the spinnerets at the apex of the abdomen a single thread was exuded, and rapidly drawn out to several feet by the breeze. Gradually the foremost pair of legs sank to the level of the post, and the entire attitude became that of intense resistance. Then suddenly and simultaneously the eight claws were unloosed, and the spider mounted with a sharp bound into the air, and went careering across the meadow. As far as could be observed, it appeared that the spider took a voluntary leap at the moment of loosing its hold. One spider, by good hap, was followed through its flight. The position of the body was soon reversed, the head being turned in the same direction as the wind. The legs were spread out, and were united at the claws by delicate filaments of silk. After flying a distance of about eighty feet, the spider gradually settled down upon the meadow. The difficulty of this observation will be understood by entomologists, for it required exact suitability of position as to light, the limitation of the flight to a moderate height, and a comparative moderation of its speed. (*Proc.*, Acad. Nat. Sci. Philadelphia, 1877, p. 308.)

TURKOMAN GREYHOUNDS.—The Jardin d'Acclimatation has lately been enriched (we learn from *La Nature*) with three Turkoman greyhounds of great beauty, the first specimens imported into Europe. The animals are known in the country under the name of Tazi, and are employed in catching hares, like the Sloughi in Algeria and the greyhounds in Persia. They are of noble aspect, and have great strength of muscle; their head is remarkably long and delicate in form. The hair on the body is short; but the ears (which are very large) are covered with long silken hair. Their legs are also covered with well-developed hair, and the contrast of this with the upper smooth part of the body is surprising at first sight; the dogs appearing as if they had large waving pantaloons, or reminding one of some kinds of fowl. One of the three dogs was obtained from the Kirghises of Emba, the two others at Samarkand (and by M. de Ujfalvy). We believe that it is among this breed that, as mentioned by Hamilton Smith, the *stop* greyhound is found so trained, that when a whole pack of them is in pursuit of a doubling hare, a stick thrown before it instantly produces a general halt, and one only is then signalled out to pursue the game.

GEOGRAPHICAL NOTES

CHINA.—Mr. E. C. Baber's long-deferred Report on the journey of the Grosvenor Mission through Western Yünnan, from Tali-fu to Têng-yüeh, contains much matter which is of interest from more than one point of view. The most important of his surveys is that of the route from Tali-fu to Têng-yüeh, as it connects Garnier's explorations with the work of Sladen's expedition, and thus puts Bhamo in topographical communication with Shanghai and Saigon. The survey next, but not much inferior, in importance, is the route from Yünnan-fu to Tali-fu, in which the track followed was different to Garnier's. Mr. Baber has also prepared a running survey of his route across China from Hankow to Têng-yüeh. His remarks on the native races are interesting, especially in regard to the Kutung people. What or where Kutung is he was unable to ascertain; he describes the men as of a dark reddish complexion, with rather prominent features, above the average height and well-proportioned, dressed in close-fitting woollen garments, which in some cases were neatly cut and handsomely embroidered. The women seen would have been considered handsome anywhere; paler in colour than the men, their oval intelligent faces reminded the observer of the so-called Caucasian type, and in every step and movement there was a decision and exactness very different from the motion of a Chinese. One of the women, too, was particularly remarkable for a peculiarity of her long hair, which was naturally wavy, a feature never met with among the Chinese. Mr. Baber was fortunate in seeing the quarterly fair at Tali-fu, at which some 5,000 people were present, many of them being Lolos, Shans, Thibetans, &c. At this stage of his journey he propounds a not improbable explanation of the term "golden teeth," as applied to the inhabitants, viz., that it arose from the discoloration of the teeth produced by chewing betel with lime. Mr. Baber's observations on the extent of the poppy cultivation will hardly be found encouraging by those who desire to see the consumption of opium put an end to, for he says that his party walked some hundreds of miles through poppies; and a similar remark applies to his account of the trade-route into Yünnan from Burmah. The valleys, or rather abysses, he says, of the Salwen and Mekong must long remain insuperable difficulties, not to mention other obstacles between Yünnan-fu and Têng-yüeh. The members of Col. Sladen's expedition appear to have assumed that, when the latter place is reached, the obstacles to a highway into Yünnan have been surmounted, whereas the fact is that the difficulties begin at that place. Loth as most Englishmen are to admit it, Mr. Baber adds, the simple and evident approach to Eastern Yünnan is from the Gulf of Tonquin, but it by no means follows that the same holds true of the western part of the province. In conclusion we may mention that an interesting feature in Mr. Baber's report is his comparison of Marco Polo's narrative with his own experiences, and his verification in many respects of the Venetian's information respecting a country almost entirely unknown to Europeans.

PRJWALSKY'S JOURNEY TO LOB-NOR.—In the *Isvestia* of the Russian Geographical Society, and as Supplement 53 to Petermann's *Mittheilungen*, the narrative of Prjwalsky's journey from Kuldja to Lob-Nor and the Altyn-Dagh, is now published, with maps showing the route and the discoveries made. We have already referred to the results of this important journey between August, 1876, and July, 1877, a journey which the enthusiastic Dr. Petermann regards as the crown of Central Asiatic exploration, and as equal in importance to Stanley's journey down the Congo, or even the attainment of the Pole. Prjwalsky gives ample details as to what he saw along the route, and his observations will be of special value to the ethnologist as containing important